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CURRICULUM GUIDE
1963
Gr 10-12

Senior High School

Curriculum Guide

Vocational Series

BUILDING CONSTRUCTION 12-22-32

(Interim Edition, Sept. 1963)

Province of Alberta

Department of Education

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CONTENTS

Introduction 3

General Objectives 4

General Information 4

Instruction on the Use of the Outline. . . 6

Carpentry 12 Course Outline. 8

Carpentry 22 Course Outline. 13

Carpentry 32 Course Outline. 18

COURSE CREDIT VALUES

Carpentry 12 . . . . . 5 credits

Carpentry 22 . . . . . 15 credits

Carpentry 32 . . . . . 15 or 20 credits

One credit corresponds to a minimum of 40 minutes of instruction time per week.

INTRODUCTION

This curriculum guide has been prepared for use in those high schools that have been approved by the Department of Education as possessing the facilities, equipment and qualified staff necessary to teach the program successfully.

The content of the three year sequence is equivalent to that of the first year of the Construction Technology Program at the Institutes of Technology. It also approximates the first two years of the Carpentry Apprenticeship program. If the graduates of the high school program are to receive advanced standing in the Technical Institute program or recognition by the Apprenticeship program, it is imperative that instruction must be such as to ensure thorough coverage of the minimal program outlined in the following pages.

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GENERAL OBJECTIVES

1. To acquaint the student with the construction industry and the opportunities for employment that exist in this field.

2. To equip a student with sufficient skill and knowledge such that he will be highly employable in the construction industry.

3. To enable a student, entering the Carpenter Apprentice program, to advance at an accelerated rate on the basis of his proven ability on the job.

4. To prepare a student to a degree of competency acceptable to the Institutes of Technology, sufficient for entry into the second year of the Construction Technology program.

SPECIFIC OBJECTIVES

1. To develop basic skill in the use of hand and power woodworking tools and equipment.

2. To develop high standards of workmanship.

3. To develop desirable habits concerning safety, good working relationships and proper use of time and material.

4. To provide students with the related and technical information essential to an understanding of the carpentry trade.

5. To develop the skills and knowledge required to interpret blueprints accurately as well as to produce accurate plans and shop drawings.

6. To impart to the student a knowledge and appreciation of the work of allied construction trades.

GENERAL INFORMATION

1. Course Credit Values:

   Carpentry 12 . . . . . 5 credits
   Carpentry 22 . . . . . 15 credits
   Carpentry 32 . . . . . 15 or 20 credits

2. Time Allocation:

   It is recommended that in the carpentry 12, 22, and 32 courses, one-third of the time be given to theory and two-thirds to shop practice.

3. Safety Program:

Every shop must have an effective safety program. In the carpentry shop particular attention must be given to the safety measures required in the industry: adequate guards; cleanliness of shop and personnel maintained at a high standard; students properly clothed for their work; etc. Shop organization must be such as to ensure stressing this very important phase of the shop program.

A good safety program features the following devices: regular, consistent and thorough instruction; constant vigilance and checking by the instructor; safety posters; student safety committee; adequate first aid equipment; instructor trained and up-to-date in first aid methods; dynamic color painting of machines and equipment; adequate working space about machines; routine report on accidents however minor; machines and tools in approved working condition; a safety conscious group of students and instructor.

4. Instructor's Records:

The instructor should keep accurate records of:

a. student enrolment and attendance
b. student accounts
c. student work activity
d. theory covered
e. tests given
f. student achievement, aptitudes and attitudes
g. up-to-date inventory of all equipment

5. Student's Records:

Instructors should ensure that the student develops and maintains a neat and accurate record of:

a. notes on theory
b. daily shop activities (time cards)

6. Achievement:

Instructors are responsible for ensuring that students are achieving to their capacities. Emphasis should be placed primarily on quality and secondly on quantity, but neither should be sacrificed for the other.

7. Enrolment:

The recommended enrolment for carpentry classes is 16 students and under no conditions should it be allowed to increase beyond 20. Two classes may easily be combined for the presentation of theory.

8. Guidance and Vocational Information:

Instructors must assume responsibility in their trade area to ensure that students and school guidance officials are aware of the local situation. It is essential that the instructors be active, interested and informed regarding the opportunities in the trade.

NOTE: In order to permit students from an academic Grade X program to cross over into the vocational program at the Grade XI level, schools may combine the 12 and 22 courses into one course for a total of 20 credits. Where these courses are combined, it is recommended that students purchase the Grade XI text only.

9. Projects:

It is expected that some projects will be used in Grade X and to a limited degree in Grades XI and XII as vehicles of instruction, and as a means of securing and retaining student interest. The onus is on the instructor to ensure that the projects selected, involve only those operations specified in the course outline, and that the time required to complete the project, does not encroach upon the time needed to learn other skills and operations.

Instructions on the Use of the Following Outline

The outline is divided into three columns designated: Related Information, References and Student Activity. The first column refers to the essential knowledge upon which a well educated employee of the construction industry will depend to adequately carry out his duties. It also includes knowledge of a general nature regarding the trade and the industry, that is not directly related to the shop activities. The second column lists the references necessary for the theory or shop activity being carried on. The third column outlines the type of activity performed by the students in the shop.

The actual list of references may be found in the back of the curriculum guide. Instructors are requested to insert references which they consider to be most suitable for the particular topics outlined. Instructors are also requested to note the time spent on the various units. This information will be extremely valuable to the curriculum committee in revising this outline. We ask that instructors keep two copies of this guide, one of which can be returned to the Department with the instructor's notations as mentioned above, and one for the instructor's own records.

NOTE: ith regard to shop drawing equipment the following is recommended:

Each shop drawing table should consist of two trestles 36" high with a loose 4' x 8' x 3/4" fir ply top. Each table then accommodates two students.

The actual drawing may be done on sulfate wrapping paper (36" x 40). The paper is attached by masking tape to tempered masonite boards 1/4" x 15¼" x 96", (three strips from a standard 4' x 8' sheet).

The rafter layout in the shop may be done on 3½" x 16' x 1" strips of brown Kraft wrapping paper stapled onto the surface of full size 2" x 4" x 16' pieces. In this way the lumber stock can last indefinitely.

CARPENTRY 12 COURSE OUTLINE - 133 HOURS

TEXT: HAND AND MACHINE WOODWORK by H. G. Miller - Macmillan of Canada

A. A Study of Hand Tools - Their Care and Safe Use

B. Materials - Information, Use and Treatment

C. Occupational Information

D. Drafting

A. Hand Tools

Aims:

1. To adjust the student's mind to be receptive to ideas of safety for himself and for others, and to develop the idea that good safety practices are highly important.

2. To guide the student in his selection and safe use of woodworking tools.

Related Information	References	Student Activities
1. Safety Education. Safety should be considered as one of the means to an end, and not as an end in itself.	Hand and Machine Woodwork - MILLER - Chap. 2 Safety Rules Workmen's Compensation Board Posters	Study Chap. 2 and do assignments. Study shop posters, films, etc. Become aware of necessity for safety rules in connection with tools and machine areas.
2. Measuring Tools, etc.	MILLER - Chap. 3 Manufacturers Information	Square up stock to size - Chap. 19. Observe proper sequence procedures. Mark out and make wood joints - Chap. 25. Student should make a representative selection of joints such as edge-to-edge, dowel, mitre, through mortise and tenon; lap, dado and rabbet.
3. Gauging, Test, etc.	MILLER - Chap. 14 Principles and Practices of Light Construction - SMITH, Section 1.	
4. Edge Tools.	MILLER - Chaps. 9, 11, 14, 26, 29. SMITH - Section 1. Stanley Tool Guide and Stanley Tool Charts Woodshop Tool Maintenance - CUNNINGHAM AND HOLTROP Principles of Woodworking. HOLTROP AND HJORTH	

Related Information	References	Student Activities
		Practice sharpening procedures for plane blades, chisels, screwdrivers, saws, axes, brace bits, hand scrapers, punches and nail sets. The practice work can be done on mild steel flat stock and round stock and finally on tools brought by the student from his home.
5. Boring Tools	MILLER - Chap. 12. SMITH - Section 1.	Projects should be selected to give practice in the use of the tools named in the text.
6. Fastening Tools	MILLER - Chaps. 13 & 15.	Suggested projects - tool box, oil stone box, straight-edge plumb rule, mitre box, door jack, ladder, drawing board, T square, window screens, dividers, blackboard compasses, etc.
B. Materials		
1. Wood - Kinds, properties, defects and blemishes, grades, measurements, costs.	MILLER - Chaps. 6, 7, 8, 30. HOLTROP and HJORTH	Student can collect, prepare and mount samples of woods and of defects and blemishes.
2. Fastening materials - nails, screws, glues, etc.	MILLER - Chaps. 13, 15, 16.	Sort nails and screws according to standard types, gauges, and lengths with a view to developing visual recognition.
3. Finishing materials - abrasives, flint, garnet aluminum oxide; steel wool, pumice stone and rotten stone, polishing compound, paints, varnishes, lacquers, sealers, stains, fillers, vehicles, thinners and solvents. Brushes and their care.	MILLER - Chaps. 26, 27, 28. HOLTROP and HJORTH Norton and Behr-Manning Instructor's manuals, Delta - Practical Finishing Methods.	Prepare and treat samples of various woods to give fairly wide coverage in the use of all the finishing materials. This should be preliminary to the actual work on projects.
4. Hardware	MILLER - Chap. 24.	Apply appropriate hardware to projects. Student may be asked to bring from home a piece of surplus hardware such as a lock set or hinge. This he could mount for display.

Related Information	References	Student Activities
C. Occupational Information	(To be divided between the beginning and the end of the program)	
1. Apprentice Program	Apprentice Board	
2. Alberta Technical Institutes Programs	Technical Institutes	
3. Compensation	Compensation	Student may be asked to produce written and/or oral reports for class discussions.
4. Labour Act	Provincial Gov't.	
5. Unions	Union Offices	
6. Insurance	Dominion Gov't.	
7. Working Conditions	Industry	
8. Legal Aspects of Occupations	Lawyers	

D. Drafting

Note: The time devoted to drafting may be reduced considerably if the class is taking Drafting 12 concurrently.

Aims:
1. To enable students to gain an understanding of the elements of drafting - the reading and writing of industry.
2. To have students acquire an appreciation for careful planning and good work habits.
3. To provide experiences in the use of drafting tools and materials in the making of working drawings.
4. To provide a background of basic drafting as a lead-in for the shop drawing units of second- and third-year carpentry.

1. Use of Drawing Tools and Materials	Technical Drawing - GIESECKE, MITCHELL & SPENCER	Learn correct use of drafting tools and materials through manipulative exercises - e.g. GIESECKE, Chap. 2, p. 60.

Related Information	References	Student Activities
2. Language of Lines	GIESECKE	Exercises - Chap. 2, p. 60.
3. Lettering	GIESECKE	See Chap. 3, p. 70 - 81, figures 122, 123, 124 and 134. (Limit to Gothic, upper case)
4. Scale Drawing	GIESECKE	Use standard ruler and architect's scale in producing exercises. See Chap. 2, Sections 35, 36, 40 & 41.
5. Plane Geometry	GIESECKE	Do exercises as illustrated in Chap. 4 - Sections 115, 116, 117, 118, 121, 122, 125, 126, 129, 130, 131, 133, 134, 137, 138, 139, 141, 155, 157.
6. Orthographic and Pictorial Drawing	Orthographic Projection Simplified QUINLAN (McKnight & McKnight) GIESECKE	Chap. 6, Sections 207, 208, 209, 213, and 224. Have students do exercises translating six-view orthographic drawing into three-view. Use: 1. Freehand sketching 2. Instruments Pictorial drawing can be developed by reversing above procedures, using oblique, cavalier, cabinet and isometric drawings. Chap. 6 & 16. Emphasize hidden line techniques. Chap. 5, Section 192, figure 264.
7. Dimensioning	GIESECKE QUINLAN	Do correct dimensioning on above exercise sheets (Both orthographic and pictorial)
8. Formal plates	GIESECKE	Do one three-view orthographic drawing with a reasonable amount of detail, and properly dimensioned. Do one standard dimensioned pictorial plate including oblique, cavalier, cabinet and isometric examples. Do one plate showing a simple constructional unit. On this plate use orthographic and as many of the pictorial types as possible.

NOTE: Whereas Carpentry 12 is an exploratory course open to all Grade X students, the Carpentry 22 and 32 courses are definitely vocational, and only those students who have displayed ability and aptitude for the program should be encouraged to enrol. It is not fair to the student to permit him to continue in a program which demands a large portion of his school time, and in which the instructor and/or the guidance counsellor feel that he has little chance of success.

CARPENTRY 22 COURSE OUTLINE - 400 HOURS

Text: PRINCIPLES AND PRACTICE OF LIGHT FRAME CONSTRUCTION by Donald C. Smith

Related Information	Reference	Student Activity
1. Review hand woodworking tools and processes of Carpentry I, with emphasis on correct sharpening methods.	SMITH, Chap. 1 Hand and Machine Woodwork - MILLER Woodworking Technology	Joint, set and file rip and crosscut saw teeth. This may be done on a piece of black iron, 16 ga. x 2" x 8", followed by practice on saws brought from home. Sharpen planes, chisels, knives, scrapers, and all common tools. Wood joints not completed in the first year - Mortise and Tenon, Dovetail, with some review of those done in Carpentry I. Make and use mitre boxes for mitre and polygon cuts.
2. Machine woodworking tools - Circular, Radial Saws, Band and Scroll Saws, Jointer Planer Drill Press Sanders - Belt, Disc	Hand and Machine Woodwork - MILLER Woodworking Technology	Each student should have practice in setting up and operating power machines, through such suggested projects as: Ladder, step ladder, lawn chair, trellises, room dividers, shelving, drafting table, tool cabinet, and many other projects.
3. Safety Education - Safe practices in the use of power machinery.		All students should have written and oral tests on the parts, maintenance, setting up and safety rules for all machines. Each student should demonstrate that he is able to apply these before being allowed to operate.

Related Information	Reference	Student Activity
4. Foundation and Form Construction for residential buildings.	SMITH, Chap. 2 & 3.	Concrete forms - open stair stringers and steps, precast steps, planters, post supports.
(a) Excavations - soils, methods, allowances for working, levels.		
(b) Footings - kinds - column, continuous, chimney, porch, stair, heavy machinery, etc.	National Building Code	Isometric and cabinet drawings of regular solid forms found in construction of buildings - post footings, precast steps, planters, beams, walls, etc.
(c) Wall Forms -		
1. Construction - framing, sheathing, oiling forms, spreaders, ties, walers, braces, stakes, reinforcing, anchor bolts, shorings.		Shop drawings in full size, of footings, forms, on building paper, using Framing and Combination Squares.
2. Erecting forms - locating, bracing, plumbing, aligning, setting joists.		
3. Placing concrete - ramps, walks, platforms, mixing, ready-mix, moving, tamping, vibrating, protecting from weather.		
4. Sidewalk forms - straight, curved, steps, drainage, divider strips.		
5. Concrete - kinds, components, transporting, placing, curing.		
5. Frame Construction	SMITH, Chaps. 5, 13.	House Construction - Students may work individually or in pairs to construct full sized section of walls or partitions, including rough opening for door and window.
(a) Types - Ballown, Platform or Western, Braced Framing, Post and Beam construction.		

Related Information	Reference	Student Activity
(b) Sills - types, parts.		
(c) Posts and columns - purpose, wood, steel, concrete.		
(d) Beams, girders - purpose, spacing, materials.		Shop drawing - construction details of wall, floor frames, with various types of rough openings. Drawings of sections through the building.
(e) Floor joists - purpose, types, specification, openings, special floors, installation, bridging.	SMITH, Chap. 4	
(f) Sub-floors - materials, purpose, methods of laying.		
(g) Wall Framing -		When time permits, a group project may be attempted which will provide experience in many areas - e.g. one car garage, granary, brooder house, poultry range shelter, movable hog house, car port, garden tool house, patio cover, dog house, playhouse.
1. Components - plates, corner posts, intersecting walls, studding, rough openings for windows, doors, chimney, stairwell, fireplace headers, trimmers, cripples, fire stops, wind bracing, storey rod.		
2. Raising Wall Frame - lifting, temporary bracing, plumbing, aligning, tieing partitions.		
3. Ceiling joists - spacing, span, size.	Chap. 6, SMITH	
4. Additional construction on walls - backings and allowances for other trades.		
(h) Wall Sheathing - kinds, materials, quantities, methods.		
(i) Scaffolding - method of construction - safety.	SMITH, Chap. 10	

Related Information	Reference	Student Activity
6. Roof Construction (a) Types of roofs - flat, shed, gable, hip, gambrel, mansard, sawtooth, polygon.	SMITH, Chapts. 7 & 8	Shop drawings of gable and hip roofs - plans, elevations, full size rafter layouts to develop true lengths.
(b) Definitions - rise, run, pitch, span, plumb cuts, seat cuts, bird's mouth, tail cut, eaves, overhang, single and double cheek cuts.	National Building Code	Construct simple project involving elementary hopper cuts to illustrate hip rafter.
(c) Relation of material sizes to spacing, span, pitch.		Construct full size roof sections using rafters of various pitch.
(d) Common rafters - 1. Length - line length, true length, shortening.		
2. Layout - line length by square root, rafter tables, scaling, stepping off, making patterns, bird's mouth, overhang, plumb cuts.		Shop drawings may also include house plans, elevations of small bungalow, or if time permits, cardboard architects models.
3. Gable studs.		
(e) Hip rafters -		
1. Length - mathematical, by tables, stepoff and slant triangle methods.		
2. Rise and run.		
3. Framing at ridge - single and double cheek cuts.		
4. Shortening for ridge and sheathing.		
5. Dropping and backing.		
6. Overhang and tail cuts.		

Related Information	Reference	Student Activity
(f) Jack rafters - kinds, lengths, seat and cheek cuts, tail cut, length, shortening.		
(g) Valley rafters - run, allowances, layout.		
(h) Roof bracing - collar ties, purlins, strong backs.		
(i) Roof sheathing - purpose materials, application.		Shop drawings of trusses - single line only, to illustrate types.
7. Exterior finish - doors, windows, trim, frames, cornices, sidings, shingles, brick.	SMITH, Chapt. 11 & 12	Construct and install door and window frames of reduced size. Construct and install door and sash in frames.
8. Related construction materials - papers, stucco wire, hardwares, fasteners, paints, preservatives.		The wall sections mentioned above may also be used in applying some of the external finishes and trims.

Text: Same as for Carpentry 22

Related Information	Reference	Student Activity
1. Review of roof framing (a) Common, hip, valley and jack rafters.	R. C. Smith Chapters 7 & 8 Wass and Sanders Chapters. 1, 4, 7 and 8	1. Roof framing and finishing a. Layout common, hip, valley and jack rafters given the span, pitch, and overhang. Do not cut but layout on building paper wrapped and stapled around 2 x 4. Students may layout all the rafters for one roof if they use different colored pencils for each rafter.
(b) Gable studs.	R. C. Smith Chapter 7 Wass and Sanders Chapter 5	b. Layout gable studs on full size stock, given span, pitch, etc. Do not cut.
(c) Ceiling joists, collar ties and purlin studs.		c. Layout collar ties, rake cut on ceiling joists, and purlin studs.
(d) Roof rafters		d. Layout and cut roof rafters for a a small span (suggested not more than six feet) given necessary pitch and overhang. Use full size stock - assemble on a rectangular platform (or any shapedesired). Layout and install gable studs, ceiling joists, collar ties, etc. Three or four students per platform.
(e) Roof sheathing - hopper cuts.	R. C. Smith Chapter 7 Wass and Sanders Chapter 9	e. Apply sheathing to the above roof.

Related Information	Reference	Student Activity
(f) Cornice construction	R.C. Smith Chap. 11	f. Apply lookout ledger, lookout, facia, plancier. (It is not necessary that this be done all the way around the roof).
(g) Building paper - roof	R.C. Smith Chap. 11	g. Apply building paper.
(h) Roof finishes	R.C. Smith Chap. 11	h. Apply shingles.
2. Allowances for sub-trades		2. Allowances for sub-trades
(a) Plumbing	R.C. Smith	a. Construct wall section of full sized stock and have students place backing and other members necessary for plumbing fixtures.
(b) Heating	R.C. Smith P. 102	b. When students are practicing setting floor joists, laying out walls, etc., have them make allowances for chimneys, heat vents.
(c) Electrical		c. When constructing wall sections, have students allow for electrical panals, fuse boxes, etc.
(d) Plastering & Stuccoing		d. Have students install plater grounds, etc. on both exterior & interior walls as required.
3. Introduction to principles of insulation		
(a) Wall insulation	R.C. Smith Chap. 12	a. Have students install some insulation in the wall sections they erect. (Blanket type recommended).
(b) Ceiling insulation	R.C. Smith Chap. 12	b. Have students install both loose fill and blanket types. Correct installation and levelling the loose fill variety.

Related Information	Reference	Student Activity
4. Vapour barrier and building paper		
(a) Vapour barrier	R.C. Smith Chapt. 12	a. Fasten vapour barrier in place over insulating on walls and ceilings.
(b) Building paper		b. Fasten building paper to window and door jambs before installing.
5. Interior and ceiling sheathings		
(a) Plaster grounds		a. See 2-d in allowances for sub-trades.
(b) Dry wall construction	R.C. Smith Chapt. 12	b. Apply wall boards to interior of wall sections. Apply corner beads.
(c) Composition boards	R.C. Smith Chapt. 12	c. Apply strapping where necessary to walls. Apply composition boards. Apply metal trim where possible.
(d) Plywood		d. Apply plywood to interior walls, interior and exterior corners.
(e) Acoustic tiles		e. Apply strapping where necessary. Apply ceiling tile of various types.
6. Plywoods - no student activity		
7. Interior finishing		
(a) Doors		a. Assemble and install door jamb. Hang and lock door.
(b) Windows	R.C. Smith Chapt. 12	b. Assemble and install window jamb. Install window frame.
(c) Interior trim	R.C. Smith Chapt. 12	c. Install interior window and/or door trim. Casing, stool and apron where necessary.
(d) Floors		d. Install hardwood flooring.
(e) Baseboards	R.C. Smith Chapt. 12	e. Install baseboards, etc., both exterior and interior corners.

Related Information	Reference	Student Activity
8. Stairs		
(a) Layout	R.C. Smith Chapt. 9	a. Layout only on full size stock straight stairs, both open and closed stringer. (Cover material with building paper to conserve material.)
9. Materials - no student activity		
10. Building code		
(a) National Building Code		a. Use as required for layout of floor joists, walls, ceilings, roofs and as otherwise necessary for instruction. Grades XI and XII students should each have a copy and should know how to use and interpret same where applicable.
11. Introduction to Strength of Materials - no student activity		
12. Occupational Information - no student activity		

REFERENCES

Title	Author	Publisher
1. Hand and Machine Woodwork	H. G. Miller	Macmillan of Canada
2. Principles and Practices of Light Construction	Ronald C. Smith	Prentice - Hall Inc.
3. Woodshop Tool Maintenance	Cunningham and Holtrop	Ryerson Press
4. Principles of Woodworking	Holtrop and Hjorth	Ryerson Press
5. Getting the Most Out of Your Abrasive Tools		Rockwell Manufacturing Co., Pittsburgh
6. Getting the Most Out of Your Circular Saw and Jointer		Rockwell Manufacturing Co., Pittsburgh
7. Getting the Most Out of Your Band Saw		Rockwell Manufacturing Co., Pittsburgh
8. Getting the Most Out of Your Drill Press		Rockwell Manufacturing Co., Pittsburgh
9. Getting the Most Out of Your Lathe		Rockwell Manufacturing Co., Pittsburgh
10. Getting the Most Out of Your Shaper		Rockwell Manufacturing Co., Pittsburgh
11. Getting the Most Out of Your Radial Saw		Rockwell Manufacturing Co., Pittsburgh
12. Building Construction - Roof Framing	Wass and Sanders	Prentice-Hall Inc.
13. Practical carpentry	Mix and Cirow	General Publishing Co.
14. Machine Woodworking	Robert E. Smith	General Publishing Co.
15. Concrete Form Construction		Thomas Nelson & Sons
16. Framing, Sheathing and Insulation		Thomas Nelson & Sons
17. Interior and Exterior Trim		Thomas Nelson & Sons

Title	Author	Publisher
18. Simplified Stair Layout		Thomas Nelson & Sons
19. Blueprint Reading and Sketching Carpentry Trades (Residential)		Thomas Nelson & Sons
20. Technical Drawing	Giesecke, Mitchell, Spencer	
21. Orthographic Projection Simplified	Quinlan	General Publishing Co.
22. Norton Lectures on Grinding		Norton Co., Worcester, Mass.
23. Behr-Manning Instructor Manual		
24. Practical Finishing Methods		Rockwell Manufacturing Co., Pittsburgh
25. National Building Code Publications		

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